SSVD Extreme Temperature Electronics for Planned Venus Missions, Phase II

Completed Technology Project (2005 - 2007)

Project Introduction

The purpose of this project is to demonstrate the feasibility of a new class of electronic devices called solid state vacuum devices (SSVD

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s), a highly enabling technology for extreme high temperature radiation hard electronics. SSVD

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s merge solid state semiconductor technology, including process fabrication techniques, with vacuum electronics, and, in this case, specifically thermionic vacuum electronics. SSVD

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s have already been demonstrated for highly demanding high frequency applications. Thermionic SSVD

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s, in which vacuum transport is by thermionically emitted electrons, are especially promising due to their intrinsic internal high temperature operation and radiation hardness. SSVD

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s are extremely well suited for extreme environments that, for example, exist on or near Venus. InnoSys proposed and successfully demonstrated in Phase I of this SBIR project SSVD

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triodes/field effect transistors and the associated assembly and sealing to meet the requirements needed for extreme high temperature electronics. In particular, SSVD

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electronics were successfully experimentally demonstrated fully operational at 500C. In addition, radiation insensitive SSVD

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electronics were also successfully experimentally demonstrated during Phase I of this SBIR project. Small scale extreme temperature, radiation insensitive SSVD

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integrated circuits (ICs) will be developed during Phase II of this SBIR project. Currently no other existing electronics can address this extreme environment.

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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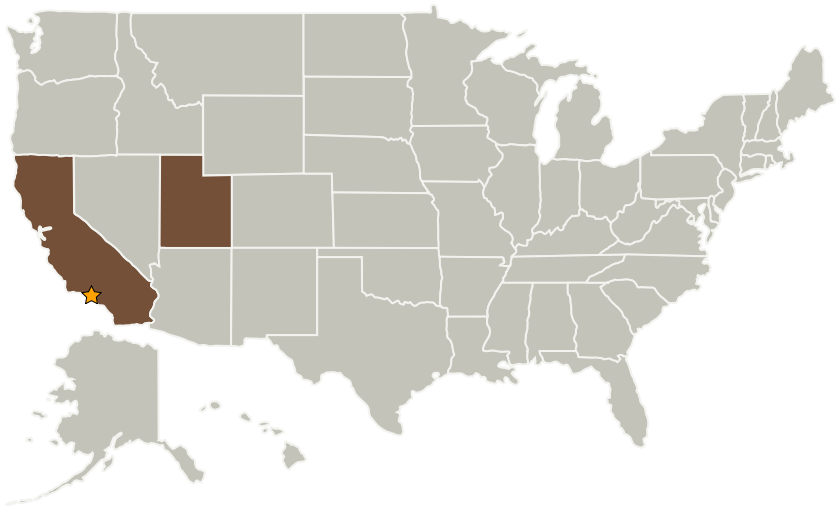
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
InnoSys, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB)	Salt Lake City, Utah

Primary U.S. Work Locations	
California	Utah

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX02 Flight Computing and Avionics
  - TX02.3 Avionics Tools, Models, and Analysis
    - TX02.3.2 Space Radiation Analysis and Modeling